able to a wider group of readers by publishing an abridged account in German.[8] While the paper contains little that is essentially new, it gives an excellent account of the biology of the collective species *Puccinia graminis* as observed by the author in Russia. The account is valuable for comparison with similar observations made in other regions, for it is possible that the ecological and biological routine of development of the grain rusts is not the same in all regions. An illustration of this possibility is found in the present paper in reference to the different sources of infection of new grain in spring in Russia and in the United States.

JACZEWSKI attributes the primary infection of wheat in spring entirely to aecidiospores from barberry. In the plains of the middle west, where barberry bushes are rare or do not occur at all over rust areas, both BOLLEY and CARLETON have found that the fungus is carried through the winter by means of surviving uredospores. In Russia JACZEWSKI finds that none of the uredospores survive through the winter, either on the straw or on living plants; nor does the mycelium of the fall survive on seedling wheat, for when infected seedlings are covered with glass cases they remain free from rust the following summer. These experiments, as well as some similar ones with older rhizones of wheat and orchard grass, the author regards as disproving the validity of ERIKSSON'S mycoplasm theory.

As to the spermatia, the author differs from the usual cytological interpretation of considering them as male cells, and considers them to be of the nature of conidia. It must be admitted that there is as much evidence for one view as for the other. Their persistency and universal occurrence he thinks is an objection to regarding them as functionless organs.

Of particular interest is the long series of cultures of uredospores on different grasses. The results are tabulated in a manner easily comprehended. A comparison of his own results with those of others suggests the possibility that the degree of specialization of form-species of rusts to certain hosts may not be the same for all regions, but may depend upon local conditions.—H. HASSELBRING.

Lipoids and respiration.—By extracting wheat germs with various solvents of lipoids, and then determining the carbon dioxid evolved from the germs during a given period of time, PALLADIN and STANEWITSCH[9] seek to establish a relation between respiratory activity and the lipoid content of plants. The germs were extracted with a given solvent until nothing was removed by new quantities of the solvent. The solvent was then removed and the germs were placed on filter paper and soaked in water for 30 minutes, after which they

[8] JACZEWSKI, A. VON, Studien über das Verhalten des Schwarzrostes des Getreides in Russland. Zeitschr. Pflanzenkrank. **20**:321–359. *figs. 8.* 1910.

[9] PALLADIN, W., and STANEWITSCH, E., Die Abhängigkeit der Pflanzenatmung von den Lipoiden. Biochem. Zeitschr. **26**:351–369. 1910.

were put into a U-tube with the filter paper on which they had been soaked. Air was drawn through the apparatus for 30 minutes, after which the carbon dioxid was determined at 3-hour intervals for a period of 9 hours in most of the experiments. The solvents used in the different experiments were alcohol, ether, anilin, chloroform, ethyl acetate, turpentine, benzine, olive oil, acetone, benzene, and toluene.

In each case two parallel experiments were conducted, one with toluene vapor drawn through the tube, and one without. In the first experiment in which living germs were used they were found rotted at the end of the 9-hour period in the tube without toluene. In the other cases it was found that the amount of carbon dioxid evolved varied according to the solvent with which the germs had been extracted. The order arranged according to the intensity of depression is as follows: alcohol, ethyl acetate, ether, benzine, chloroform, aniline, turpentine, olive oil, benzene, acetone, toluene. In the tubes with toluene this sequence is different, but the toluene vapor in every case caused a depression of the amount of carbon dioxid evolved. The authors point out that there is a general relation between the quantity of lipoids dissolved by acetone, benzene, chloroform, ether, and alcohol, and the depressing effect of these substances on respiration. There is, however, no strict proportionality between the quantity of lipoids removed and the depression of respiration, as would be expected if the depression were due only to the removal of lipoids and not to other possible effects of the solvents.—H. HASSELBRING.

Germination.—GASSNER[10] has studied the germination characters of seeds of two South American grasses, *Chloris ciliata* and *C. disuichophylla*. The behavior of the two species is in the main the same, so we need consider only the results with *C. ciliata*, on which the main work was done. With dry storage the seeds show a marked after-ripening. The most favorable period of dry storage is 30–40 weeks. With 10 weeks or less of dry storage none will germinate in darkness at optimum temperature, but after 39 weeks 7–8 per cent will germinate under the same conditions. After 9 weeks of dry storage, only 3 per cent germinate in light, but after 39 weeks 73 per cent respond under the same conditions. If the germinators are dark during the early periods of germination and then transferred to light, the early subjection to darkness greatly reduces the total percentage of germination; the seeds become "dunkelharten." This effect of darkness appears only when the temperature is above the minimum for germination (20° C.). At low temperatures (6–10° C.) the germination is not affected by such a period of darkness. GASSNER lines the experimental facts up with the conditions the seed must meet in nature, which gives great ecological significance to his results. Whatever the ecological value of such work, it must be stated that it adds little to a funda-

[10] GASSNER, GUSTAV, Ueber Keimungsbedingungen einiger südamerikanischer Gramineensamen. Ber. Deutsch. Bot. Gesell. **28**:350–364. 1910.